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| 09/869,123 | 10/03/2001 | Karsten Reihs | | 2354 |
| 22850 | 7590 | 10/19/2006 | | |
| C. IRVIN MCCLELLAND OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | EXAMINER TRAN, THAO T | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1711 | |

DATE MAILED: 10/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/869,123

Applicant(s)

REIHS ET AL.

Examiner

Thao T. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) 11-26 and 29-51 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 27, 28 and 52-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/31/06.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 1/31/2006 has been entered.

2. The IDS filed on 01/31/2006 has been considered.

3. The rejections of the claims and arguments as presented in the Examiner's Answer are maintained below.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-10, 27-28, and 52-54 are rejected under 35 U.S.C. 112, first paragraph, because because the specification, while being enabling for the product made in the examples in the specification, does not reasonably provide enablement for any and every surface having the claimed properties. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims without undue experimentation.

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Specifically, the claim currently covers all surfaces with the claimed properties. However, the specification does not enable one skilled in the art to make a surface with the claimed properties without using the exact methods or materials found in the examples. The full range of methods or materials that the claim covers is therefore not disclosed by the specification and one skilled in the art would require undue experimentation to discover the full scope of the applicant's invention. The prior art does not specifically describe the claimed surface topography properties or how to obtain them, and one of ordinary skill in the art would not recognize methods of forming such surfaces without using the exact examples from the present specification. Due to the unpredictable nature of the art, it would not be apparent that simple modifications of the working examples would yield surfaces of the claimed surface topography. Thus, one skilled in the art considering the present specification would not know how to obtain the claimed surfaces beyond those specific examples.

Claim Rejections - 35 USC § 102

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-6, 8-10, 28, and 52-53 are rejected under 35 U.S.C. 102(b) as being anticipated by Clark et al. (US Pat. 5,674,592).

Clark et al. discloses functionalized films that give ultraphobic properties to a substrate. The substrate is a metal (column 6, lines 15-17) or a polyimide (example 1), (claims 5-6 and 8-9) and the coated substrate demonstrates ultraphobic behavior, with contact angles on the order of 171 ° (column 6, lines 48-52), meeting this part of claims 3 and 4. Further, the surfaces are such that

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water rolls off at the "slightest inclination of the substrate" (column 6, lines 52-53). The examiner assumes that the term "slightest inclination" in Clark et al. is less than 10° , thereby meeting this aspect of claim 3. The surface in Clark et al. is coated with a Langmuir-Blodgett film that gives it ultraphobic properties.

Langmuir-Blodgett films are inherently amphoteric and also meet the definition of "hydrophobic phobicization auxiliary." As such, Clark et al. also fulfills claims 10 and 28.

Clark et al. does not specify the value of S as the applicant does in claims 1 and 2. However, the applicant has not shown that the value of S is independent of the contact angle of the substrate. It appears from the current application, see table 1, that any ultraphobic surface having a contact angle above 150° would inherently have a surface topography with the value of S in claims 1 and 2. Therefore the examiner deems that the structure in Clark et al. meets the S value requirement of claims 1 and 2.

Regarding newly added claims 52 and 53, Clark et al. discloses a surface that may be either hydrophobic or oleophobic (column 2, lines 43-44 and column 7, lines 12-17), meeting that aspect of these claims.

8. Claims 1-5, 8, 27, and 52 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi et al. (EP 825241 A1).

Takahashi et al. discloses a water repellent coating composition. It teaches that the coating composition yields contact angles up to 156° (example 1, meeting the applicant's claims 3 and 4) and that the substrate can be polyurethane (claims 5 and 9 in Takahashi et al. meeting the applicant's claims 5, 8, and 27). Takahashi et al. does not specify the value of S as the applicant

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does in claims 1 and 2. However, the applicant has not shown that the value of S is independent of the contact angle of the substrate.

It appears from the current application, see table 1, that any ultraphobic surface having a contact angle above 150° would inherently have a surface topography with the value of S in claims 1 and 2. Therefore the examiner deems that the structure in Takahashi et al. meets the S value requirement of claims 1 and 2.

Takahashi et al. also does not disclose a roll-off angle, as the applicant does in claim 3. The examiner's position is that since the contact angle in Takahashi et al. is the same as the contact angle in claims 3 and 4 and since the surface in Takahashi et al. is designed to be water repellant, the surface in Takahashi et al. will inherently possess the roll-off angle that the applicant claims in claim 3.

Regarding newly added claim 52, Takahashi et al. discloses a surface that is hydrophobic, meeting that aspect of the claim.

Claim Rejections - 35 USC § 103

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al. in view of Baumann et al. (US Pat. 5,624,632).

Clark et al. is applied to claim 6 as discussed above, but does not explicitly state that the metal that is used can be an aluminum-magnesium alloy. Baumann et al. discloses an aluminum-magnesium alloy useful in the preparation of airplane fuselage surfaces (column 1, lines 45-46).

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It is well known in the art that it is advantageous to have an ultraphobic surface coated on an airplane fuselage in order to prevent ice from forming on the fuselage in cold weather.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the coating in Clark et al. on the aluminum-magnesium substrate in Baumann et al. The motivation for doing so would be to provide an airplane fuselage surface that resists ice formation.

Therefore it would have been obvious to combine Baumann et al. with Clark et al. to obtain the invention as specified in claim 7.

11. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. in view of Baumann et al.

Takahashi et al. is applied to claim 1 as discussed above, and shows that the water resistant coating can be used on airplane fuselages (figure 17), but does not disclose the exact metal from which the fuselage is made. Baumann et al. discloses an aluminum-magnesium alloy useful in the preparation of airplane fuselage surfaces (column 1, lines 45-46). It is well known in the art that it is advantageous to have an ultraphobic surface coated on an airplane fuselage in order to prevent ice from forming on the fuselage in cold weather. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the coating in Takahashi et al. on the aluminum-magnesium substrate in Baumann et al. The motivation for doing so would be to provide an airplane fuselage surface that resists ice formation. Therefore it would have been obvious to combine Baumann et al. with Takahashi et al. to obtain the invention as specified in claims 6 and 7.

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12. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al. in view of Goetz et al. (US Pat. 6,124,039).

Clark et al. discloses a surface that meets the requirements of claim 1, but does not include a substrate made from AlMg₃. Goetz et al. discloses a substrate made from AlMg₃ used in solar cells. Since it is useful for solar cells to have hydrophobic or oleophobic surfaces in order to keep them clean during use, it would have been obvious to coat the substrate in Goetz et al. with the coating in Clark et al.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to coat the substrate in Goetz et al. with the coating in Clark et al. The motivation for doing so would be to obtain a substrate (or solar cell) with hydrophobic or oleophobic surface properties. Therefore it would have been obvious to combine Goetz et al. with Clark et al. to obtain the invention as specified in claim 54.

13. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. in view of Goetz et al.

Takahashi et al. discloses a surface that meets the requirements of claim 1, but does not include a substrate made from AlMg₃. Goetz et al. discloses a substrate made from AlMg₃ used in solar cells. Since it is useful for solar cells to have hydrophobic surfaces in order to keep them clean during use, it would have been obvious to coat the substrate in Goetz et al. with the coating in Takahashi et al.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to coat the substrate in Goetz et al. with the coating in Takahashi et al. The motivation for doing so would be to obtain a substrate (or solar cell) with hydrophobic surface properties.

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Therefore it would have been obvious to combine Goetz et al. with Takahashi et al. to obtain the invention as specified in claim 54.

Response to Arguments

14. Applicant's arguments have been fully considered but they are not persuasive.

The Applicant argues that the declaration provided shows that surfaces having the claimed contact angle do not necessarily possess the claimed S integral value. The Appellant argues that this negates the position that the S integral value would be inherent to a material having the claimed contact angle.

However, the Applicant appears to have shown only estimated values for the prior art. A theoretical result does not substitute for factual, measured results. In this case, it appears that three of the substrate surface dimensions of a few examples of the prior art have been used to generate a number of data points, which were then used to calculate a value for the S integral. First, it is unclear how three dimensions can generate a number of data points with certainty. Although the Applicant argues that 262,144 data points have been used to obtain the integral data, it is unclear how this number of data points can be estimated using only three averages. The Applicant have access to actual topography data points for the calculations of the working examples as opposed to the averages provided by the reference. Secondly, it is noted that the dimensions used are taken from the unfinished surface. The examples of the Clark reference discuss properties of the nanostructure film, which is then coated with a monolayer of 08F17(CH₂)₁₁SH. The contact angles are measured from this coated surface, although the data relied upon by the applicant appears to represent an uncoated surface.

In response to the Applicant's argument that the declaration supports the accuracy of the calculations, it is first noted that the Appellant's allegations of accuracy do not constitute proof of such a statement. The Applicant has not provided support to show the accuracy of such calculations. Furthermore, it is noted that this statement refers to the accuracy that can be obtained from the number of data points. However, it appears that these data points have been generated from only three dimensions. The examiner questions the accuracy of the generated data points. Also, it is noted that these data points are generated from the substrate dimensions but not from the coated substrate dimensions. The Applicant further theorizes the affects of this coating on the modeled surface. The Applicant has not shown proof of accuracy of the calculated values.

Regarding the Applicant's arguments that the examples and specification show various methods of achieving the invention, it is the examiner's position that, although one of ordinary skill in the art may have the ability to duplicate the Applicant's examples, undue experimentation would be needed to achieve the Applicant's properties otherwise. In other words, the specification and examples do not guide one of ordinary skill in the art to specific ways of achieving the properties but rather focus on a great number materials and methods that may be used or combined to achieve the claimed properties. The specification also focuses on the methods of measuring or calculating the claimed properties. However, this does not enable one of ordinary skill in the art to experiment within the teachings of the specification with sufficient certainty of achieving the desired results. Although a number of materials and surface modification methods have been discussed, the specific steps or combinations of materials that are used to achieve the claimed properties are not discussed.

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Contact Information

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao T. Tran whose telephone number is 571-272-1080. The examiner can normally be reached on Monday-Friday, from 9:00 a.m. - 5:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571-272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Thao T. Tran
Primary Examiner
Art Unit 1711

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October 16, 2006